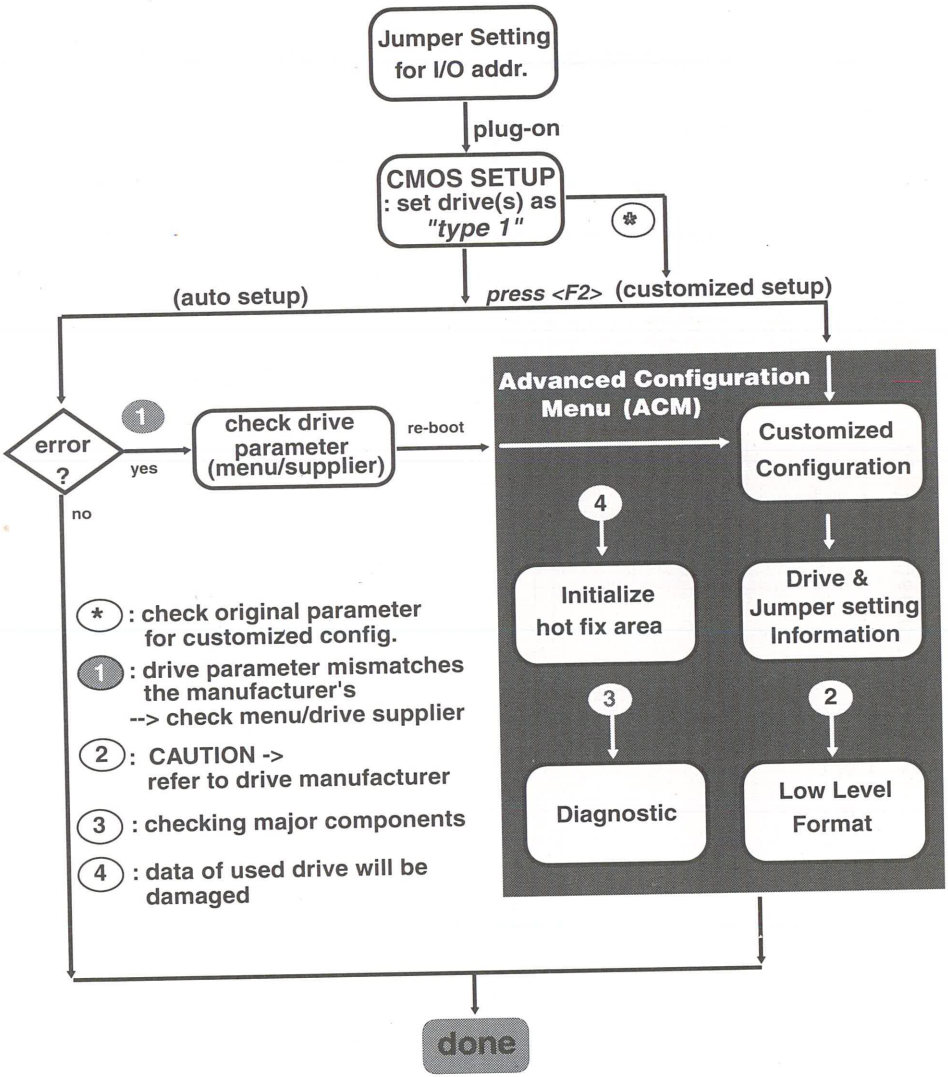
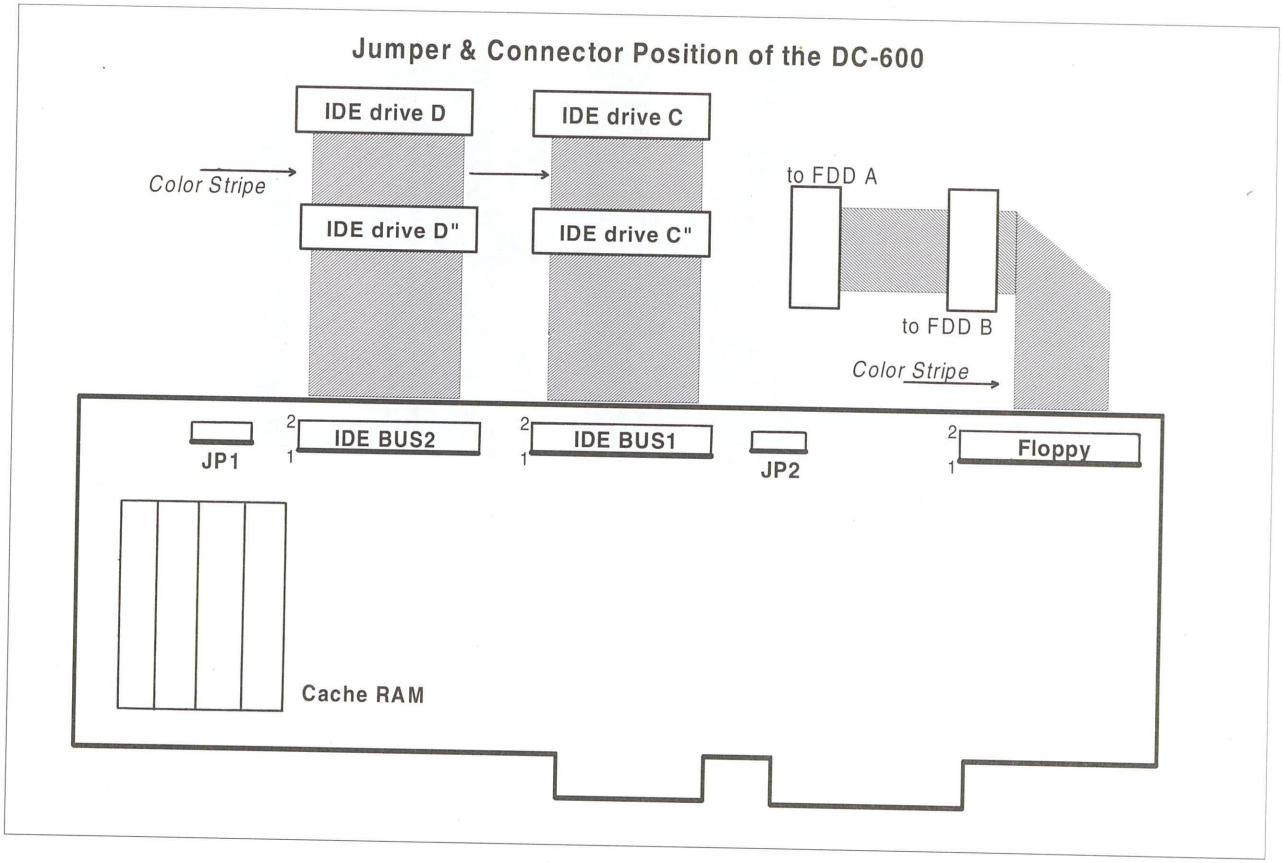
ISA/IDE CACHE CONTROLLER

DC-600 USER'S MANUAL

Quick Reference Chart for Single Drive Installations




Jumper & Connector Position of the DC-600
IDE drive D
IDE drive C
Color Stripe
IDE drive D"
IDE drive C"
to FDD A
to FDD B
Color Stripe
JP1
2
1
IDE BUS2
2
1
IDE BUS1
JP2
2
1
Floppy
Cache RAM

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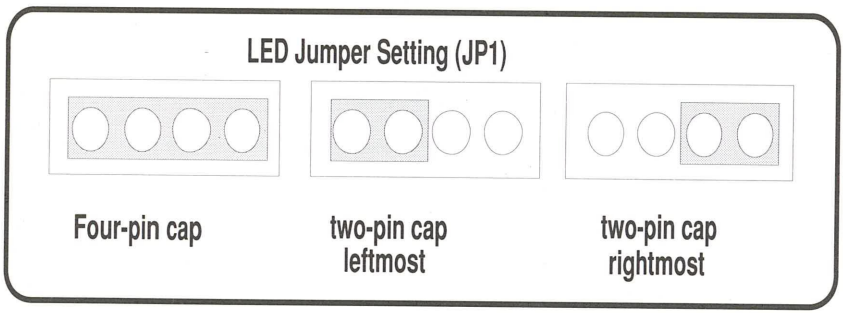
Chapter 1:
Preparation

The DC-600 is designed to be extremely easy to configure and install. It has two jumper blocks, labelled JP1 and JP2, and four SIMM sockets for cache RAM installation.

1.1 JP1- Hard Drive LED Indicator

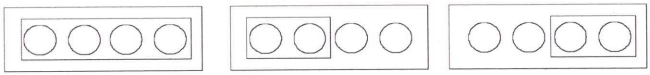
JP1 is used to indicate hard disk activity. The figure below depicts the correct connections for 2-pin and 4-pin caps, to the hard disk activity LED on the front panel of your system.



1.2 JP2- Configuration Jumper Block

JP2 is a block of six pin sets numbered 1 through 6. These determine the ROM address (pins 1-3), floppy enable/disable (pin 4), and primary/ secondary hard disk I/O (pin 5); the final pin set (pin 6) is reserved. Jumper setting information is illustrated below.

LED Jumper Setting (JP1)



Four-pin cap | two-pin cap leftmost | two-pin cap rightmost

Jumper Setting (JP2)

JP2: 123456

0: installed
1: removed

(reserved)

(HDD I/O: 0 -> primary, 1-> secondary)

Floppy : 0 -> enabled, 1 -> disabled)

ROM addr.

000	DC000 -- DFFFF	100	D0000 -- D3FFF
001	DC000 -- DFFFF	101	CC000 -- CFFFF
010	D8000 -- DBFFF	110	C8000 -- CBFFF
011	D4000 -- D7FFF	111	ROM Disabled

Cache RAM Installation:

1. 256KB/1MB/4MB 80ns SIMM are required & can be mixed for different combinations.
2. can be installed or not installed for each SIMM socket, but at least one of the SIMM sockets must be installed.

Warning

It is especially important with a caching controller that you do not power-off the system while the hard drive activity LED is still active.

Doing so will result in loss of data!

ROM Address:	(0 = jumper installed; 1 = jumper removed)			
(pins 1-3)	000	DC000-DFFFF*	100	D0000-D3FFF
	001	DC000-DFFFF	101	CC000-CFFFF
	010	D8000-DBFFF	110	C8000-CBFFF
	011	D4000-D7FFF	111	ROM disabled
Floppy:	jumper installed = enabled*			
(pin 4)	jumper removed = disabled			
Hard disk I/O:	jumper installed = primary*			
(pin 5)	jumper removed = secondary			
	*factory setting			

For most installations, the factory default jumper settings will ensure proper operation. However, if the system contains a second hard or floppy controller, or other boards that use reserved memory (e.g. a network card), you may need to manually configure the DC-600 to avoid potential address conflicts.

Once installed and in use, DC-600 jumper setting information can be checked in the ***Jumper setting information*** module of the Advanced Configuration Menu (ACM), as illustrated in Section 4.3.

1.3 Cache DRAM Installation

The DC-600 features four SIMM sockets, arranged in four separate banks, for extremely flexible cache DRAM installation. 256KB/1MB/4MB "fast page mode" SIMMs are required, with a minimum rated access of 80ns. or less, and can be mixed in any combination. Each of the memory banks can be installed or left empty, but at least one of the four sockets must be installed.

SIMM specification:	256KB/1MB/4MB "fast page mode" 80ns.
	Bank 0: 0MB/256KB/1MB/4MB Bank 1: 0MB/256KB/1MB/4MB Bank 2: 0MB/256KB/1MB/4MB Bank 3: 0MB/256KB/1MB/4MB

Chapter 2:
Quick Setup

Once the jumpers have been properly set, and cache DRAM memory has been installed, the DC-600 is ready to be installed in your system. If you are upgrading an existing IDE hard drive subsystem, it is advisable to do a complete file-by-file (as opposed to image) backup of your data to removable media.

The DC-600 requires a 16-bit standard AT slot, and, for most installations, can be treated as a direct replacement for an IDE hard/floppy bus controller (or "paddleboard"). Any existing IDE bus controller in your system must be removed or disabled; if you plan to use the floppy disk controller on the DC-600 (JP2 - pin 4), any existing floppy disk controller in your system must also be removed or disabled. Normal care and precautions should be observed when handling the DC-600 as well as the other components in the system.

2.1 Hard Drive Activity LED

If your system has a hard drive activity LED on the front panel, connect the LED cable to JP1 on the DC-600, as illustrated in Section 1.1.

2.2 Floppy Drive Cabling

If you are attaching a new or existing floppy drive(s) to the DC-600, connect the drive(s) to the FLOPPY DISK connector on the DC-600 using either an existing or the supplied 34-pin standard floppy cable.

2.3 IDE Hard Drive Cabling

If you are attaching a **single** new or used IDE drive to the DC-600, connect the drive to the IDE BUS1 connector on the DC-600 using either an existing or the supplied 40 pin data/control cable.

If you are attaching **two or more** IDE drives to the DC-600, refer to the advanced installation instructions in Chapter 3 before continuing.

2.4 CMOS Configuration

If you are installing a single new IDE drive for the first time, it is necessary to configure the system CMOS, setting Hard Disk C to "*type 1*". This enables the system to sense the presence of the DC-600, where the actual drive parameter tables are stored. If necessary, refer to your motherboard or system manual for further instructions on configuring the system CMOS.

If you are upgrading an existing IDE drive subsystem, the values previously stored in the system CMOS are unlikely to require modification.

2.5 Auto Setup

For most **single** new or used IDE drive installations, no additional steps are necessary to ensure proper operation of the DC-600 with your disk subsystem. Power up the system and ensure that the system POST (Power On Self-Test) is functioning properly. The DC-600 should display its own POST test and messages immediately **below** and **after** the system POST test and messages. An example screen is depicted below.

```
Primary ISA IDE Cache Controller

Press F2 or SHIFT-F2 to enter advanced configuration menu.
1024K bytes of CACHE DRAM installed.
```

If the DC-600 POST test and messages do **not** appear, there may be a ROM address or timing conflict between the DC-600 and other adapter cards in the system. Re-check the ROM address set for the DC-600 (JP2 - pins 1-3) against the ROM address of any other adapter cards in the system for potential conflicts. If the system contains a 16-bit VGA adapter with a "Fast Address Decode" option, **disable** the feature.

2.6 Drive Parameters

For most single new or used IDE drive installations, there is generally no need to access the Advanced Configuration Menu (ACM) to ensure proper operation of the DC-600 with your IDE drive. The DC-600 obtains the correct drive parameters directly from the drive itself, by automatically issuing an "IDE Identify Drive" command. If you are upgrading a **single** existing IDE drive subsystem with the DC-600, the drive will function exactly as before. If you are installing a new IDE drive, the drive is now readied for operating system installation; refer to your operating system manual for further instructions.

Note

IDE drives are factory low-level formatted. It is unnecessary and inadvisable to low-level format a new IDE drive.

Some IDE drives either do not respond correctly to the "IDE Identify Drive" command, or respond with the physical parameters, rather than the manufacturer's recommended translation parameters. In such cases, the DC-600 will generally issue an error message similar to the one depicted below.

```
=ERROR=
 IDE BUS1 drive 0: Bad drive or drive parameter error!
 Get the correct parameter from drive manufacturer & enter
 Advanced Configuration menu to reconfigure the system.
```

If you receive this message, you must enter the Advanced Configuration Menu (ACM) by pressing [F2] or [SHIFT-F2], and manually enter the correct drive parameters in the ***Customized configuration*** module. Refer to your drive manual for the correct parameters of a new IDE drive. If you are upgrading an existing used IDE drive subsystem, the drive parameters previously stored in the system CMOS will be correct.

Once you have entered the correct drive parameters in the ***Customized configuration*** module of ACM, select the *Update EEPROM and Exit* option from the main ACM menu. The system will reboot and the new parameters will be checked by the DC-600 to ensure they are correct. If correct, a used IDE drive will function exactly as before, while a new IDE drive is now readied for operating system installation. If an error message is still displayed, you must verify and re-enter the correct drive parameters.

If necessary, refer to Chapter 5 for detailed instructions on entering correct drive parameters in the ***Customized configuration*** module of the ACM.

Chapter 3:
Advanced Installations

The DC-600 provides considerable flexibility for installing two or more IDE drives, and special care and consideration should be given to cabling and configuring additional drives.

The DC-600 supports two separate IDE buses -- IDE BUS1 and IDE BUS2 -- and each bus in turn can support two IDE drives, for a total of four installable drives. However, in order to maintain compatibility with the widest possible range of operating systems and hardware, the DC-600 only notifies the operating system of the presence of a maximum of **two logical storage units**. Each IDE bus on the DC-600 is presented to the operating system as a **single** unit, regardless of whether one or two physical drives are actually connected to it. The DC-600 manages the attachment of two physical drives to one bus by **linking** the combined capacities of the two physical drives together into a single logical unit.

3.1 Upgrading a Dual Drive IDE Subsystem

If you are upgrading an **existing** dual drive IDE subsystem, and wish to preserve the format and data on your drives, then you must attach your current physical drive 1 to IDE BUS1, and your current physical drive 2 to IDE BUS2, using separate cables. If you are adding a second **new** IDE drive, refer to Section 3.2 below for other options.

With a standard IDE bus controller, two physical drives are normally attached together, in dual-drive master-slave configuration, with a single IDE 40-pin control/data cable. Jumpers or switches on each of the two IDE drives are set, assigning drive 1 to "master" mode, and drive 2 to "slave" mode. The two physical drives are registered in the system CMOS, and presented to the operating system, as two logically separate storage units.

If you are replacing a standard IDE bus controller with the DC-600, and wish to preserve the existing format and data integrity of your two IDE drives, you must reset the jumpers or switches on **both** drives to "single drive master" mode (which is normally the factory default setting -- refer to your drive manual or dealer for details). Using **separate** cables, drive 1 should then be connected to IDE BUS1, and drive 2 connected to IDE BUS2. On powering-up the system, if your existing IDE drives respond correctly, with the manufacturer's recommended translation parameters, to the "IDE Identify Drive" command issued by the DC-600, no additional steps are required for successful installation; your existing drive format and data will be intact.

3.2 Installing A Second IDE Drive

If you wish to add a second IDE drive, you have two possible attachment and cabling options: (1) **linking** the second drive to the first with the same cable to create a single logical storage unit, or (2) **separately** cabling the second physical drive in connection to IDE BUS2.

(1) If you choose to link the two drives together to form a single logical storage unit, refer to Section 3.3 below.

(2) If you choose to preserve the format and data integrity of your drive(s), then you must set the jumpers or switches on both IDE drives to "single drive master" mode. Physical drive 1 should remain cabled to IDE BUS1, and physical drive 2 should be connected to IDE BUS2 using a separate cable. In this configuration, physical drive 1 will remain intact as logical storage unit C, and physical drive 2 is readied as logical storage unit D for operating system installation.

3.3 Linking Additional Drives

If you choose to link two physical IDE drives together as one logical storage unit, and one or both drives contain valuable data, then you should do a file-by-file (as opposed to image) **backup** of your data before proceeding. Linking combines two drives together to create a completely new logical storage unit, as illustrated in the example below.

Drive	Model	Cylinders	Heads	Sectors	Capacity
C	Fujitsu BP-3TA1	667	4	33	42MB
C"	Quantum LP52A	751	8	17	49MB
C	HOST DRIVE C	514	10	37	92MB

To link two IDE drives together, you must set physical drive 1 to "dual drive master" mode and drive 2 to "dual drive slave" mode; consult your drive manual for jumper or switch details. Connect both drives to IDE BUS1 (or IDE BUS2), using a single 40-pin IDE control/data cable. Once connected to the DC-600, the master drive will be registered as drive C (or D) and the slave as drive C" (or D") in the ***Customized configuration*** module of the ACM, where you will have the option of linking the drives together to form a single logical storage unit, readied for operating system installation.

Warning

Linking two drives into a single logical storage unit cancels the original format of the drives, and renders the data inaccessible. Backup your data before proceeding.

If you plan to add a third or fourth IDE drive to the DC-600, you must link (or optionally mirror) the additional drives in master-slave configuration. Note that you cannot read or write to a DC-600 linked drive unless it is attached to a DC-600 (or DC-620) and remains coupled to the second drive with which it was originally linked.

The table below provides general guidelines for installing multiple drives with the DC-600.

Installing.	Connection	Physical drive	Logical drive	IDE mode	OS Reformat
1st drive	IDE BUS1	drive 0(C)	C	Master	Optional
2nd drive	IDE BUS2	drive 0(D)	D	Master	Optional
3rd drive	IDE BUS2	drive 1(D")	D	Slave	Yes (D and D")
4th drive	IDE BUS1	drive 1(C")	C	Slave	Yes (C and C")

3.4 Mirroring

If addition to linking two physical drives together as a single logical storage unit, the DC-600 also gives you the option of mirroring a first drive with a second. Mirroring is a method of maintaining the integrity of data on one physical drive by maintaining an exact duplicate on a second drive. In the event that one drive fails, the second drive insures that valuable data was not lost with it.

If you elect to mirror an IDE drive with the DC-600, you must connect two drives together in master-slave configuration with a single cable, for attachment to either IDE BUS1 or IDE BUS2. Once the drives are installed, access the ***Customized configuration*** module of the ACM and set the attribute of physical drive 1(C") or (D") to *Mirror of C* or *D*.

Note that in order to properly mirror a drive, the second *mirroring* drive (C" or D") must be of equal (or greater) capacity to the first *mirrored* drive (C or D).

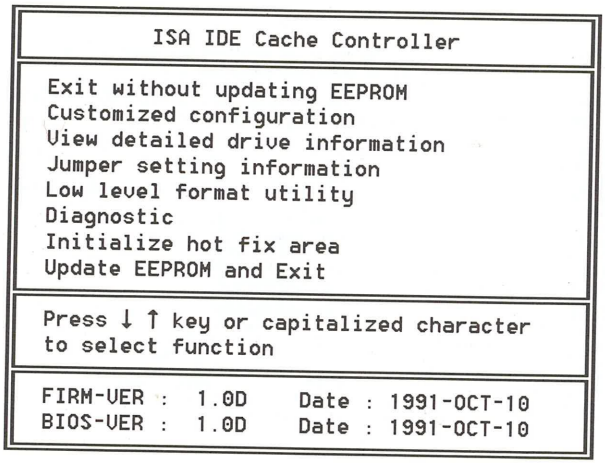
Chapter 4:
Advanced Configuration Menu

The Advanced Configuration Menu, or ACM, is the DC-600's setup and configuration program, and gives you control over drive arrangements and cache operations. The program (and default settings) are stored in an on-board EPROM and EEPROM, which allows you to save your own preferences as power-on defaults.

The ACM is accessible only during the DC-600's POST test on powering up or resetting the system, when the following message appears on screen:

```
Primary ISA IDE Cache Controller

Press F2 or SHIFT-F2 to enter advanced configuration menu.
```

Pressing [F2] or [SHIFT-F2] at this time will access the ACM main menu, which is illustrated below.


ISA IDE Cache Controller
Exit without updating EEPROM
Customized configuration
View detailed drive information
Jumper setting information
Low level format utility
Diagnostic
Initialize hot fix area
Update EEPROM and Exit
Press ↓ ↑ key or capitalized character to select function
FIRM-VER : 1.0D Date : 1991-OCT-10
BIOS-VER : 1.0D Date : 1991-OCT-10

Each option on the main menu takes you to a different module of the ACM, all of which are discussed in detail in this chapter and the next.

4.1 Customized configuration

Customized configuration is the single most important module of the ACM, and allows you to install, link and mirror drives, and set cache controller parameters. Refer to Chapter 5 for a detailed discussion of this module and its several options.

4.2 View detailed drive information

This module of the ACM displays information scanned from the physical drives attached to the DC-600. Note that not all drives respond to the "IDE Identify Drive" request, and, among those that do, not all respond with the same quantity of information; some also respond with the physical parameters, rather than the manufacturer's recommended translation parameters.

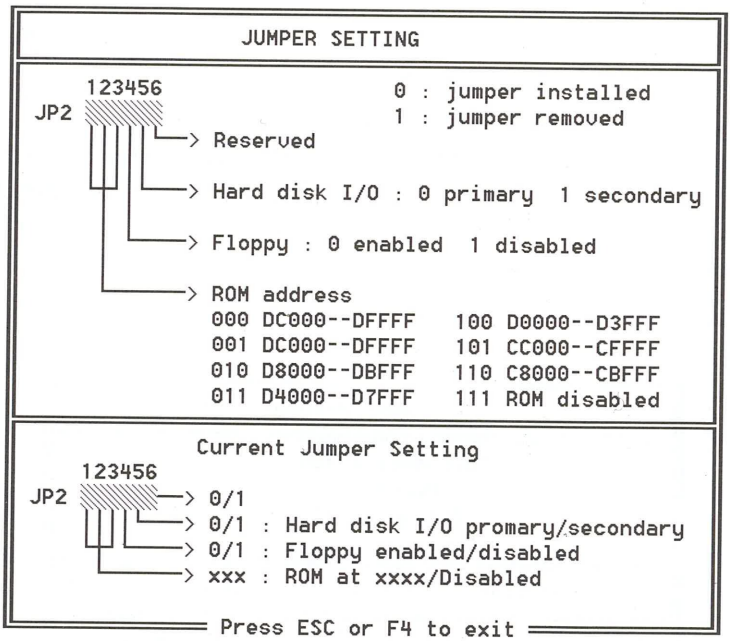
A sample screen is depicted below.

```
IDE BUS 1 drive 0 detailed information

Drive's model ..................... Conner Peripherals 100 MB - CP3104
Firmware revision # ............... 2.18
Serial # .......................... C1LB47
Total physical cylinders ......... 776
Heads per cylinder ................ 8
Sectors per head .................. 33
Drive's buffer type ............... Dual port multisector buffer & read caching
Drive's buffer size ............... 64 sectors
PIO timing mode ................... mode 0 : cycle time = 600ns
DMA capability .................... not supported
DMA timing mode ................... not supported
Read write multiple capability .. not supported
Doubleword I/O capability ........ not supported
Format speed tolerance gap ....... not required
Track offset option ............... not available
Data strobe offset option ........ not available
Rotational speed tolerance ....... > 0.5 % / <= 0.5 %
Disk transfer rate ................ > 5 Mbs && <= 10 Mbs
Spindle motor control option .... Not implemented
Head switch time .................. > 15 u sec / <=15 u sec
Encoding type ..................... non-MFM, hard-sectored
                Press ↑ ↓ key for next page, ESC or F4 to exit
```

4.3 Jumper setting information

This module of the ACM displays the current jumper settings of JP2. It provides a convenient way of checking the ROM address of the DC-600 to aid you in configuring other adapters that require reserved memory.

A sample screen is depicted below.

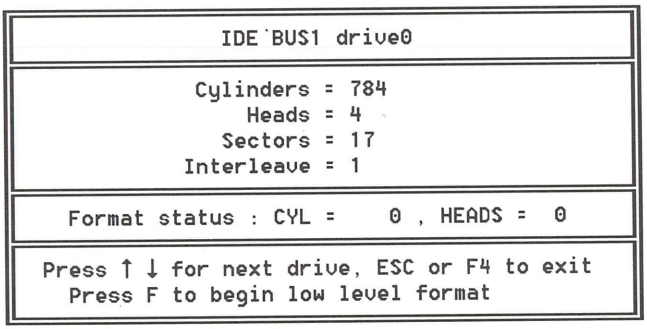


4.4 Low level format utility

IDE drives are factory low level formatted for optimal performance, and readied for operating system installation, when shipped by the manufacturer. Under normal circumstances, it is both unnecessary and inadvisable to low level format an IDE drive. In the event that a low level format seems necessary (e.g. multiple bad sectors), contact your dealer or drive manufacturer before proceeding. Some IDE drive manufacturers build low level format routines into the drive itself, and supply special, model-specific software programs for this purpose.

If you choose to execute a low level format from the ACM, enter the manufacturer's recommended drive parameters or obtain the parameters from the ***View detailed drive information*** module of the ACM. IDE drives normally support 1-to-1, or non-interleaved, operation.

A sample screen is depicted below.


IDE BUS1 drive0
Cylinders = 784
Heads = 4
Sectors = 17
Interleave = 1
Format status : CYL = 0 , HEADS = 0
Press ↑ ↓ for next drive, ESC or F4 to exit
Press F to begin low level format

Warning

Performing a low-level format causes all information and data on the drive to be lost.

4.5 Diagnostic

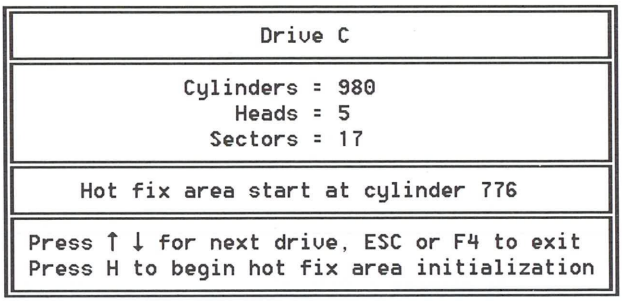
This module of the ACM allows you to perform diagnostic tests on various critical components of the DC-600. In the event of malfunctioning of your drive subsystem, the diagnostic tests can assist you in determining whether the problem originates with the DC-600 or with one of the installed IDE drives.

A sample screen is depicted below.

```
        IDE Cache Controller Diagnostic          ERROR TEST
                                                =COUNT=COUNT=
              CPU test : Passed                  0     0
            Timer test : Passed                  0     0
             SRAM test : Passed                  0     0
        EEPROM checksum : Passed                 0     0
         EPROM checksum : Passed                 0     0

   Cache DRAM test : Pattern = 5555
     Bank0 = 1024 KB  Status = 1024 KB OK        0     0
     Bank1 = 1024 KB  Status =    0 KB OK        0     0
     Bank2 =    0 KB  Status =    0 KB OK        0     0
     Bank3 =    0 KB  Status =    0 KB OK        0     0

  IDE BUS1 drive0 connection test : Passed       0     0
  IDE BUS1 drive1 connection test : No drive     0     0
  IDE BUS2 drive0 connection test : No drive     0     0
  IDE BUS2 drive1 connection test : No drive     0     0

  Press S for one loop, I for infinite loop test.
       Press ESC or F4 to abort test or exit.
```

4.5 Initialize hot fix area

This module of the ACM allows you to reserve a small area (128kb) of your IDE drive for defect management by the DC-600, as depicted below.


Drive C
Cylinders = 980
Heads = 5
Sectors = 17
Hot fix area start at cylinder 776
Press ↑ ↓ for next drive, ESC or F4 to exit
Press H to begin hot fix area initialization

To activate the DC-600's "Hot Fix" defect management, you must *enable* the "Drive C(D) HOT FIX" option in the ***Customized configuration*** module of the ACM as well; see Section 5.3 for further details. Because it alters the total formatted capacity of your drive, the "Hot Fix" option should only be initialized prior to operating system installation.

Warning

Initializing the "Hot Fix" option on a formatted drive will cause loss of data.

If enabled, the DC-600 will reallocate a reserved sector to data if and when it senses an error during a write operation. However, because most IDE drives manage and maintain their own defect lists internally, this option should be enabled only with particularly defect-prone drives.

Chapter 5:
Customized Configuration

The ***Customized configuration*** module of the ACM gives you access to the advanced features supported by the DC-600. The module is divided into three functional feature blocks, as depicted below, which control, respectively, physical drive information, logical storage unit information, and cache optimization options.

	Cylinders	Heads	Sectors	Attribute	Capacity
IDE BUS1 drive 0(C)	776	8	33	Drive C	100
IDE BUS1 drive 1(C")	0	0	0	disable	0
IDE BUS2 drive 0(D)	667	4	33	Drive D	42
IDE BUS2 drive 1(D")	751	8	17	Link to D	49

	Cylinders	Heads	Sectors	Track-remapping	Capacity
HOST DRIVE C	776	8	33	Disabled	100Mbytes
HOST DRIVE D	514	10	37	Disabled	92Mbytes

Cache line size = 16KB	Write mode = Write back
Read ahead segments = 0	Write time threshhold = 0.5S
Cache control = Enabled	Drive C HOT FIX = Disabled
Optimized for = DOS	Drive D HOT FIX = Disabled
INT13 BIOS=CTRL BIOS moved to RAM	

Press ↑ ↓ ← → to move between field, use SPACE-BAR, PgDn, PgUp or 0-->9 to select or edit the field, ESC or F4 to exit.

5.1 Physical Drive Information

The first block of the ***Customized configuration*** screen displays the parameters (cylinders, heads and sectors) for each physical IDE drive connected to the DC-600.

Cylinders, Heads and Sectors

These parameters are normally read from the IDE drive and automatically updated without user intervention. However, if an IDE drive fails to respond to the "IDE Identify Drive" request issued by the DC-600, you may need to manually enter the correct parameters based on the manufacturer's recommendations.

Attribute

The "attribute" for IDE BUS1 drive 0(C) and IDE BUS2 drive 0(D) is fixed as *Drive C* and *Drive D*, respectively. If installed, IDE BUS1 drive 1(C") and IDE BUS2 drive 1(D") have three possible attribute options: *disable*, *Link to C* or *D* (the default) and *Mirror of C* or *D*.

If you set the attribute of a drive to *disable*, it will be ignored by the DC-600.

If you set the attribute to *Link to C* (or *D*), physical drives C and C" (or D and D") will be linked as a single logical storage unit, and their combined parameters and capacity will be listed as HOST DRIVE C (or D), readied for operating system installation.

If you set the attribute to *Mirror of C* (or *D*), physical drive C" (or D") will function as an exact duplicate, or mirror, of drive C (or D). In this case, the parameters and capacity of HOST DRIVE C (or D) will be equivalent to physical drive C (or D).

For further information on the *Link to...* and *Mirror of...* attributes, please refer to Sections 3.3 and 3.4.

Capacity

"Capacity" refers to the total storage capacity of the drive and is derived from the following equation:

Capacity = (Cylinders) x (Heads) x (Sectors) x 512 Bytes

5.2 Logical Drive Information

The second feature block of the ***Customized configuration*** module displays the parameters of the two logical storage units supported by the DC-600 and presented to the operating system.

Cylinders, Heads and Sectors

If only one drive is connected to IDE BUS1(2), these parameters will be identical to the physical drive parameters. If two drives are connected to one bus and linked, the data shown represents the combined parameters of the logical storage unit (C+C" or D+D"). These parameters are calculated automatically by the DC-600 to deliver maximum storage capacity.

Capacity

"Capacity" refers to the total storage capacity of the logical unit. Capacity cannot be increased, but can be decreased if special conditions warrant it.

Track-remapping

"Track-remapping" is *disabled* by default and should be *enabled* only if the total capacity of the logical storage unit exceeds the maximum supported by the operating system (e.g. when attempting to utilitize a logical storage unit of greater than 528MB with some DOS versions).

5.3 Cache Optimization

The third and last block of the ***Customized configuration*** module allows you to set cache controller options, and optimize the DC-600 for your operating system.

Cache line size

"Cache line size" allows you to change the size, in kilobytes, of cache lines (or buffers). Options include *2kb, 4kb, 8kb* and *16kb* (the default), depending on how much cache memory is installed. You may wish to experiment with the different values to obtain optimum performance.

Read ahead segments

"Read ahead segments" allows you to specify how many cache segments will be read ahead of a specific data request. Segment size is defined by the *cache line size,* and options range from *0* (the default) to *3*. Once again, you may wish to experiment with different values, but as a general rule performance is likely to improve if you increase the number of read ahead segments, particularly with smaller cache line sizes.

Cache status

"Cache status" allows you to set the cache as *Enabled* or *Disabled.* The cache is *Enabled* by default, but you may find it necessary to temporarily disable the cache (e.g. when installing a new operating system or hardware). When Cache status is *disabled*, data transfer requests and commands are passed directly to the drive itself.

Optimized for...

"Optimized for" allows you to specify the operating system installed on the system, and sets cache parameters accordingly. Options include *DOS* (the default), *Windows*, *OS/2*, *Novell* and several versions of UNIX. The table below provides some suggested cache line sizes, for different operating systems and installed cache memory sizes.

Cache Size	1MB	2MB	4MB	8MB	16MB
DOS/Windows	4kb	8kb	16kb	16kb	16kb
Novell	4kb	8kb	16kb	16kb	16kb
UNIX	2kb	4kb	8kb	16kb	16kb

Note that these parameters are recommendations only, and that cache performance depends on other factors as well: among them, the type of applications you use and the degree of file fragmentation on your drives. Periodically defragmenting your drives, in particular, can significantly improve the performance of the DC-600.

Drive HOT FIX

"Drive C(D) HOT FIX" has two options: *Disabled* (the default) and *Enabled*. If *Enabled,* the DC-600 will reallocate a reserved sector to data if and when it senses a media error during a write operation. To enable this option, you must first access the ***Initialize hot fix area*** module of the ACM, and reserve a section of the drive for defect management. Since "Hot Fix" defect management subtracts from the formatted capacity of a logical storage unit, it can be initialized only on a clean, unformatted drive.

Appendix A:
Error Messages

Error codes may be generated at various stages in the DC-600's BIOS initialization procedure. If an error occurs, the BIOS will display a message accompanied by one of several error codes, which are listed below.

Code	Message	Description
1	Controller Failure!	Extended command enabled
2	Controller Failure!	Query controller information
3	Cache Operation Failure!	Write back cache to drive and flush cache
4	Cache Operation Failure!	Disable cache
5	Cache Operation Failure!	Write cache DRAM
6	Cache Operation Failure!	Read cache DRAM
7	Controller Failure!	Query controller information error during DRAM test
8	Cache RAM Error at Bank 0	DRAM error at bank 0
9	Cache RAM Error at Bank 1	DRAM error at bank 1
10	Cache RAM Error at Bank 2	DRAM error at bank 2
11	Cache RAM Error at Bank 3	DRAM error at bank 3
12	No Cache RAM Installed!	No DRAM installed
13	Controller Failure!	Read EEPROM
14	Controller Failure!	Write EEPROM
15	Controller EPROM Checksum Error!	Controller EPROM checksum error

On powering up the system, if the DC-600 issues the message *Error Code = 1* with no further details, one of four possibilities exist:

Controller is not functional
No cache DRAM is installed
TAG SRAM test failure
Parity error on cache DRAM

Power off the system, wait a few moments and then power the system back on.

Some system BIOSes may issue a *HDD Controller Failure* message if no cache DRAM is installed.

INT 13 BIOS

"INT 13 BIOS" allows you to select the INT 13 handler, a DOS software interrupt used to control hard disk I/O (read/write operations). Three options exist: *CTRL BIOS moved to RAM* (the default), *CTRL BIOS ROM*, and *Mainboard BIOS*.

CTRL BIOS moved to RAM: This option takes that portion of the controller's ROM which normally handles INT 13, and remaps it to conventional memory (0-640kb), where it occupies 1kb. This option is provided, and enabled by default, to ensure compatibility with some early system BIOSes, which may otherwise experience timing problems with the DC-600 (and IDE drives generally).

CTRL BIOS ROM: Selecting this option instructs the DC-600 to handle INT 13 from its ROM address in reserved memory. Because the DC-600 communicates with the system across a 16-bit bus, selecting this option typically results in degraded performance, relative to the other two possible options. However, if your system supports "shadow ram", remapping the controller's ROM to system RAM can result in superior performance.

Mainboard BIOS: This option assigns the handling of INT 13 to the system BIOS instead of the controller BIOS. Some system BIOSes also support the remapping to conventional memory of the INT 13 BIOS handling routines; consult your system manual for details.

Write mode

"Write mode" allows you to select one of two methods for writing modified cache data back to disk: *Write back* (the default) and *Write through*.

In *Write back* mode, the DC-600 only writes modified cache data back to disk when the system is idle, or when a cache read request misses and it becomes necessary to flush the modified cache line buffers to make room for new data. *Write back* mode results in superior cache performance because it permits the cache controller to combine and sort write operations prior to updating the disk, and because the updating is done in the background when the system is idle or the *write time threshold* is reached.

Warning

Powering down or resetting the system while the Hard Disk Activity LED is active will cause loss of data.

In *Write through* mode, data is updated to disk whenever a write command is issued. Cache performance will be somewhat less than in *Write back* mode, since the cache controller must write data to disk immediately, instead of waiting until the system is idle or the cache line buffers are full.

Write through mode should be selected if your system is subject to intermittent power failures, or "crashes" frequently due to unpredictable hardware or software, and if you use software that verifies data written to disk.

Write time threshold

"Write time threshold" allows you to specify the maximum delay time before modified cache data is written to disk. Acceptable parameters are in milliseconds, and range from *.5* (the default) to *14*. This option is only active when the cache is operating in *Write back* mode.

Appendix B:
Technical Specifications

Performance

- ❑ Effective disk seek time: <0.4msec (random and sequential)
- ❑ Maximum DTR (Disk-to-Cache): 5MB/sec
- ❑ Maximum DTR (ISA-to-Cache): 5MB/sec
- ❑ Sustained DTR (CoreTest): 2600kb/sec
- ❑ Cache memory hit ratio: cache memory dependent

Technical

- ❑ Microprocessor: Intel 80C188
- ❑ Cache memory: 4 banks SIMMs, expandable 256kb-16MB
- ❑ Bus interface: 16-bit ISA (EISA compatible)
- ❑ Maximum I/O bus speed: 12MHz
- ❑ Maximum hard drives supported: 4 IDE (up to 4GB per drive)
- ❑ Maximum floppy drives supported: 2
- ❑ ROM addressing: jumper selectable

Functional

- ❑ WD1003 emulation mode support
- ❑ Optional disk mirroring for reading error tolerance
- ❑ Optional "hot fix" sectoring for writing error tolerance
- ❑ Multiple sector transfer support
- ❑ Enhanced INT 13 BIOS relocation
- ❑ Optional track remapping and automatic type table creation
- ❑ Caching algorithms: fully associated LRU, automatic read ahead, and optional deferred write back
- ❑ Compatible with all major operating systems